A. INTRODUCTION

While BEN's structure and basic financial assumptions are given and fixed, its input variables (such as costs and compliance dates) are often subject to your judgment. For instance, your analysis of the facts might change as new information is supplied by the violator, changing the BEN calculation accordingly. Regardless of whether you are working on an initial or subsequent analysis, it is important to think through the basis for these various inputs, keeping in mind that the BEN results might ultimately be presented in settlement negotiations. As discussed in Chapter 1, BEN is intended solely for use in negotiation. In general, benefit calculations for trial or administrative hearing should be presented by a financial expert. Nevertheless, the basis you develop for settlement negotiations will be helpful to an expert should a trial or hearing be necessary.

Most issues in a BEN analysis center around the costs, the dates, and the discount rate. The remainder of this chapter provides guidance on how to determine the appropriate inputs to use in a BEN calculation.

B. OBTAINING COST INFORMATION

One question that frequently arises in calculating economic benefit is where to find cost information. One possible source is the engineers and technical staff in your enforcement program, because they are usually aware of what reasonable costs might be for most pollution control technologies and remedial activities. They might also know of standard cost information that exists in publications.

Another potential source of information is the violator. The violator might willingly give you the data you need. Otherwise, there are a number of legal approaches you can take to get the data from the violator. The EPA has authority under several of its statutes to request the necessary information, regardless of the status of

the enforcement action. In addition, this information may be obtained under judicial or administrative discovery. In any event, with a legal issue such as this one, you should consult with the appropriate attorney in your organization.

C. DETERMINING COMPLIANCE COST INPUTS

In order to determine the cost inputs needed to run the BEN model, you must have a defensible theory of on-time compliance (i.e., knowledge of the pollution control system or measures the violator should have installed and operated earlier to have prevented the violations at issue in the case). There are two general rules:

General Rule 1: The best evidence of what the violator should have done to prevent the violations is what it eventually does (or will do) to achieve compliance. This rule is instructive in those cases where the violator may appear to be installing a more expensive pollution control system than EPA staff believe is necessary to achieve compliance. In such situations, the proper cost inputs in the BEN model are still based on the actual (more expensive) system being installed. This is because EPA should not second-guess the business decisions of a violator. A violator often will have sound business reasons to install a more expensive compliance system. For example, the violator may believe:

- the system is more reliable, easier to operate or maintain, or has a longer useful-life;
- the system will be less expensive to operate in the long-run;
- the system works well with other systems at the facility; the system fits within an existing building; or

- o the violator has an existing relationship with the manufacturer or trusts the manufacturer to build a high quality product.

In short, EPA assumes a company selects the most appropriate method of compliance for its business, which may not always be the method with the lowest initial capital cost.

General Rule 2: Costs truly not associated with pollution control efforts to remedy the violations alleged in the complaint are excluded from the BEN model inputs. But the violator must present convincing evidence that the costs were not associated with the operation of the pollution control system.

The following scenarios illustrate the interactions of these two general rules. Common arguments by violators to reduce the benefit are shown in **bold**, followed by the proper response:

1. **The cost of the roof on the new treatment building should not be included since the roof is not needed to operate the treatment system.** In virtually all cases the cost of the roof should be included in the BEN inputs unless the violator can conclusively prove the treatment system would operate just as effectively and efficiently without the roof (without any modifications to the systems) and the roof is not a customary part of such treatment systems. This is often an impossible argument for a company to make as it must essentially argue that putting a roof on was a waste of money (i.e., it served no legitimate business purpose).

2. **The cost of the paint on the walls and the landscaping around the treatment building should not be included since they are not necessary to achieve compliance.** While such items may not be directly necessary to achieve compliance, if these items are normally part of such construction projects, they should be included in the initial capital cost input. Further, such expenditures often provide intangible and tangible benefits, such as improving the appearance of the facility, reducing erosion and dust, preserving the building, and creating a more attractive environment for employees, visitors and customers. The assumption is that if the company had complied on time, it would have made these very same expenditures and, thus it benefitted by delaying them.

3. **The cost of an extra (backup) pump should not be included since it is unlikely to ever be used.**

While the pump may never be used, if reasonable engineering practice would include an extra pump (or any other backup systems), then its cost should be included in the initial capital cost input in the BEN model. Given that the company purchased the extra pump, the burden is on the company to show that it is not necessary to achieve and consistently maintain compliance. Further, if the cost of the extra pump was subtracted from the initial capital cost input, annual operation and maintenance costs might need to be increased to reflect the greater importance of maintaining the existing pumps.

4. **The cost of building the second floor above the treatment plant should not be included since it is used exclusively for purposes unrelated to compliance.** If the second floor is not being used to support the pollution control system and appears not likely to be used in the foreseeable future, then the incremental cost of building the second floor may be subtracted from the initial capital cost input.

5. **The cost of building the tertiary treatment system should not be included since only the primary and secondary treatment systems were necessary to remedy the violations.** If the tertiary treatment system was, in fact, not necessary to prevent the violations alleged in the complaint, but rather is necessary for achieving compliance with new standards or treating new flows, then its cost should be subtracted from the initial capital cost. Recall that the initial capital cost should reflect the pollution control system that was necessary to have remedied the violations at the time and under the conditions alleged in the complaint. The key point here is that the violator must convince EPA that the additional expense does not have any practical business motive related to remedying the violations alleged in the complaint. (See examples of such motivation in General Rule 1, above.)

6. **No additional labor is necessary to operate the new pollution control system since existing employees operating the old system will do the work.** If the existing employees were operating an old pollution control system that is being replaced by the new system, then this claim may be correct and, in fact, if the new system is more efficient to operate, less labor may be required. The assumption here is that the total labor costs associated with the old pollution control system (which is being replaced by the new system) are less than or equal to the labor costs for the new system. Variable 4 in the BEN model, which represents the net change in annual operating expenses, should reflect these costs.

7. **The labor costs for the new system are really zero because we are reassigning the workers from another part of the plant. Therefore, since we are not hiring any additional workers to run the**

system, there are no additional incremental labor costs. This claim is not correct since the employees who will operate the new system are not coming from the old pollution control system that is being replaced. Rather, they are being brought in from another part of the facility. If the company had complied on-time, it would have had to shift these employees to pollution control and given up the work these employees otherwise would have done somewhere else (e.g., the production line) during the period of noncompliance.[60]

D. CHARACTERIZING COSTS

The cost inputs (depreciable investments, one-time expenditures and annual costs) are the most important variables affecting the final BEN result. The following are questions affecting the cost inputs that are likely to come up in settlement discussions or litigation:

- What is the appropriate technology to bring the violator into compliance?
- What will it cost to install the technology?
- How will the violator comply?
- How should a violator's partial or sequenced expenditures be considered in a BEN calculation?

The following scenarios provide guidance on how to handle some typical situations. For each case, we will assume that the violator needs to purchase and install pollution control equipment costing $1,000,000 in order to comply with environmental requirements.

1. The violator spends $100,000 on a system that does not work. The violator should have spent $1,000,000 in order to get a satisfactory system in place; but, instead it spent $100,000 on-time for a system that did not work. The correct entry for the capital cost is $1,000,000. The basic argument for this approach is that the Agency wants the regulated entity to do the job correctly the first time. If the BEN calculation included a reduction in the cost entries for the "cheap fix," then the Agency would be encouraging this type of unacceptable behavior.

[60] This is the concept of opportunity cost. Given a fixed set of resources, the cost of using resources for a particular use should be measured by the benefit lost by not using them in their best alternative use.

The enforcement team might find that the violator had some reasonable basis or justification for selecting the inexpensive technology. If the violator went to a reputable firm, the firm recommended the system that failed, and the violator's reliance on the recommendation was reasonable, then a substantial adjustment is probably appropriate. In that case, the team must make a judgment about how large a credit it will give the violator, based on the reasonableness of the violator's position. The lowest capital cost entry in BEN would be $900,000 in this scenario, which would allow a full recognition of the $100,000 already spent. But the litigation team could easily decide to credit only a portion of the $100,000.

2. The system works, but is too small. The violator spent $100,000 on-time for a system that was too small to solve the pollution problem. The existing system can be incorporated into the final, fully-sized system. In this case, it is appropriate for the Agency to subtract from the total required investment the $100,000 already spent; the BEN capital cost input would be $900,000. The reason for this treatment is that the violator gained a benefit on only the $900,000 that it did not spend and not the $100,000 it did spend.

3. Same case as 2, but the violator has a letter from an appropriate government official approving the system. While the violator has a reason for being out of compliance, it still had the benefit of using the $900,000 for other purposes while it was in violation. Thus, the capital cost entry for BEN is $900,000. Keep in mind that BEN is "no-fault" in nature. Regardless of how good the violator's excuse is, it still had the use of the $900,000 over the period of the violation. The primary difference between this and the scenario in case 2 above is the existence of at least an arguable approval by the regulatory agency. This is a legal distinction, not an economic one.

4. The violator complies in stages. The violator puts part of the pollution system into operation (with actual pollution reduction) one year after the non-compliance date at a cost of $200,000. One year later (and two years after the non-compliance date), the violator puts a second piece of the system costing $300,000 into operation (which results in additional pollution reduction). Three years later the entire system is in operation, and the final piece cost $500,000.

In order to calculate the economic benefit, you should make three separate BEN runs, each with the same non-compliance date and the same penalty payment date:

a. $200,000 initial investment, and a one-year period of non-compliance;

b. $300,000 initial investment, and a two-year period of non-compliance;

c. $500,000 initial investment, and a three-year period of non-compliance.

In this case, as each component of the system became operational, the violator was no longer gaining any economic benefit from delaying that segment of the investment. When the three calculations are finished, you add the results from the three runs to determine the total economic benefit.

5. The system is operational at the conclusion of a series of expenditures. This scenario is similar to case 4 above (where the violator purchased and installed the various system components over three years), except that in this case the system is put into operation only after all of its components are installed, instead of sequentially.

The proper handling for BEN is to enter $1,000,000 as a capital cost with a non-compliance period of three years. This treatment is based on the assumption that the pattern of expenditures would generally have been the same if the violator had complied on-time as it was when the violator complied late. In either case, the violator required three years to comply. In order to comply on-time, it would have had to have started three years before the compliance date. This situation is illustrated in Exhibit 4-1 below. The timelines show the effect of the violator's decision to delay compliance by three years.

EXHIBIT 6-1

Complying Firm's Time Line (assume all dollars are of equal value)

7/1/85	7/1/86	7/1/87	Compliance Date: 7/1/88
*	*	*	*
Decision to comply	Expenditures for Part A $200,000	Expenditures for Part B $300,000 System on-line	Expenditures for Part C $500,000

Noncomplying Firm's Time Line (assume all dollars are of equal value)

7/1/81	7/1/82	7/1/83	7/1/88	7/1/89	7/1/90	7/1/91
*	*	*	*	*	*	*
			Decision to comply (Date compliance required)	Expenditures for Part A $200,000	Expenditures for Part B $300,000	Expenditures for Part C $500,000 System on-line

Despite the fact that the violator spent money for the system over three years, we assume that it was all spent on the date compliance was achieved. This assumption is made for simplicity's sake, and to balance the assumption that all the money should have been spent on the first day of noncompliance (when in fact, it would need to have been spent over a period of three years earlier in order to prevent the violations). The alternative would be to determine the amount and date of each of the violator's expenditures, and then do a separate BEN calculation for each expenditure. The alternative approach would require a lot more effort to do the BEN calculations and in most cases it would result in only a slightly higher benefit amount.

6. The pollution control equipment will be leased rather than purchased. The enforcement team finds out that the violator has been leasing the equipment it needs to comply for $125,000 per year. Rather than entering the $1,000,000 as a capital cost, you should enter a zero for capital cost and $125,000 as an annual cost.

7. Compliance is cheaper than non-compliance. The violator comes into compliance late and finds that it has been saving money since it installed the new technology. This is probably occurring because the new complying technology allows the violator to recover materials and/or reduce operation and maintenance costs. The BEN analysis produces a negative value, confirming that the violator would have been better off had it complied on-time.

The benefit component of the penalty is zero. It is likely that there were other factors causing the violator to delay compliance. For example, the violator might have felt that the new processes and technology needed to comply would have adversely affected its product quality. In situations such as these, the enforcement team should carefully consider the appropriate gravity component of the penalty. The violator intentionally delayed compliance and thus should be subject to an appropriate penalty.

E. PERIOD OF VIOLATION

A major consideration in the BEN analysis is the definition of the violation period. As this interval increases, the economic benefit generally increases. For each month that the violator delays complying, it delays capital and one-time investments, and avoids operation and maintenance expenses. In practice, the period of violation is sometimes not clear. There might be evidentiary problems proving the entire period of violation. It might be helpful to run several different BEN calculations to show the impact of different violation periods on economic benefit.

Another point to keep in mind is that as of the date the BEN analysis is performed, the violator might not be in compliance. Therefore, you must make an assumption regarding the date of compliance. In discussions with the violator about the BEN calculation, you should be explicit about your compliance date assumption. You should then make clear to the violator that further delays in compliance will yield a higher economic benefit, and thus a higher penalty. Conversely, earlier compliance will yield a lower penalty. By conveying this information up front, you will give the violator added incentive to comply early, and will also avoid

having to give the violator any "unpleasant surprises" should you have to increase the benefit component of the penalty.

F. PENALTY PAYMENT DATE

The economic benefit increases as the penalty payment date extends further into the future. You should be certain that the violator knows: (1) the penalty payment date you used in your economic benefit calculation; and, (2) that if the date is actually later than you have assumed, the economic benefit will be higher. On the other hand, if the violator settles the case and pays its penalty prior to the date you used in your calculation, the benefit component of the penalty will be lower. By conveying this information, you will give the violator added incentive to settle promptly. In addition, as with the compliance date issue, this approach will allow you to avoid giving the violator any "unpleasant surprises" should you need to increase the benefit component as a result of a delay in the settlement. See Footnote 43 on the use of escrow accounts.

G. SELECTING THE DISCOUNT RATE

The violator might argue that a different discount rate should be used in the economic benefit analysis. In general, you should involve a financial analyst or contact the U.S. EPA enforcement economics toll-free hotline at (888) ECON-SPT (326-6778) or benabel@indecon.com if the violator raises questions about the discount rate. In 1992, the rate that BEN uses, the weighted-average cost of capital, was changed from the equity cost of capital after an in-depth review and analysis. The procedure used to calculate the weighted-average cost of capital is described in Chapter 3.

The violator may suggest a calculation of the equity tailored to the firm or affected facility. For example, defendants often request an adjustment in the discount rate to more precisely reflect their financial condition. If you want to make any changes to the discount rate, it is strongly recommended that you consult EPA headquarters and/or an economist or financial analyst. Should EPA headquarters or your financial analyst agree to employ a more specific discount rate, you must make the violator aware that a corporate-specific analysis could yield either a higher or a lower discount rate than the standard value. Thus, the new economic benefit figure could be higher than the benefit figure computed using the standard value.